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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,190	02/25/2004	Stanley John Becker	608-420	3370

23117 7590 10/26/2004  
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EXAMINER

OH, TAYLOR V

ART UNIT PAPER NUMBER

1625

DATE MAILED: 10/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/785,190	<b>Applicant(s)</b> BECKER ET AL.	
	<b>Examiner</b> Taylor Victor Oh	<b>Art Unit</b> 1625	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 February 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 19-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/215,299.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/25/04</u> . | 6) <input type="checkbox"/> Other: _____  |

The Status of Claims:

Claims 19-42 are pending.

Claims 19-42 have been rejected.

DETAILED ACTION

1. The Pre-Amendment dated 2/25/2004 has been received and placed on record in the file. Claims 1-18 are canceled and newly presented claims 19-42 are under consideration in this Office Action.

Priority

2. It is noted that the examiner has been acknowledged that the application is a continuation of 09/215,299 (12/18/1998 ABN), which has foreign priority documents, United Kingdom 97270326 (12/23/1997) and United Kingdom 9817572(08/12/1998) which are in the file.

Drawings

3. None.

***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686

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F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 19, 24-30, and 38 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, and 12-14 of U.S. Patent No. 6,794,535.

Although the conflicting claims are not identical, they are not patentably distinct from each other because U.S. Patent No. 6,794,535 does disclose the claimed process as described in the following claim 1:

1. A process for the production of lower aliphatic esters which comprises reacting a lower olefin selected from the group consisting of ethylene and propylene with a C<sub>1</sub> to C<sub>4</sub> carboxylic acid in the vapour phase in the presence of a

heteropolyacid catalyst selected from the group consisting of 12-tungstophosphoric, 12-molybdophosphoric, 12-tungstosilicic and 12-molybdosilicic acid, wherein a) the reaction is carried out in a plurality of reactors set up in series, and b) the feedstock has no more than 0.1 ppm of metallic or metal compound impurities prior to being brought into contact with the heteropolyacid catalyst.

12. A process as claimed in claim 1, wherein said lower olefin is ethylene.

13. A process as claimed in claim 1, wherein the mole ratio of olefin to the C<sub>1</sub> to C<sub>4</sub> carboxylic acid in the reactant gases fed to the first reactor is in the range of from 1:1 to 18:1.

14. A process as claimed in claim 1, wherein said plurality of reactors set up in series is in the form of one long reactor which has a plurality of catalyst beds set up in series.

However, the instant invention differs from in the prior art that the claimed aliquot of the reactant monocarboxylic acid is introduced as a liquid into the feed gas to the second and subsequent reactors so as to maintain the olefin and to monocarboxylic acid ratio in the feed gas to each of the second and subsequent reactors within a range of 10:1 to 16:1.

Concerning the introduction of the aliquot of the olefin and the monocarboxylic acid in a ratio of 10:1 to 16:1 to the second and subsequent reactors, the specification of the prior art expressly teaches that the addition of aliquots of the monocarboxylic acid to the feed gas to the second and subsequent reactors should be sufficient to bring the mole ratio of the olefin to acid within a range of 10:1 to 16:1 ( see col. 3, lines 23-26). Therefore, it would have been obvious to the skilful artisan in the art to be motivated to incorporate the limitation of olefin and monocarboxylic acid ratio to the second and subsequent reactors within a range of 10:1 to 16:1 into the claims in order to emphasize the certain essential features of the claimed process because they are not patently distinct from each other with respect to the claims of themselves.

### ***Claim Rejections - 35 USC § 103***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 19-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atkins et al (EP 0757027) in view of Nishino et al (Toku-Kai-Hei 7-71907).

Atkins et al discloses a process for the synthesis of esters by reacting an olefin such as ethylene with acetic acid (see page 3, lines 45-49) in the presence of the heteropolyacid catalyst on a siliceous support derived from synthetic silica (see page 3, lines 9-11) in a three-zone concentric tubular reactor equipped with a cooling jacket (see page 5, lines 8-15).

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In the reaction mixture, the mole ratio of olefin to the lower aliphatic mono-carboxylic acid in the range from 1:1 to 15:1, preferably from 10:1 to 14:1 (see page 3, lines 50-52).

Furthermore, the reaction is performed in the vapor phase above the dew point of the reactor contents with the use of the supported heteropolyacid catalyst as a fixed bed in the center section of the reactor (see page 5, line 19); the vapors of olefins and acids are passed over the catalyst at a GHSV in the range from 100 to 5000 per hour (see page 4, lines 1-2). With respect to the reaction temperature and pressure parameters, the reaction process is carried out at a temperature of from 150-200<sup>0</sup> C and at a pressure of at least 400 Kpa (see 4, lines 4-5).

However, the instant invention differs from the prior art in that four reactors are set up axially in series and each reactor has a set of three concentric tubes; the coolant containing monocarboxylic acid is sprayed upward radially around the center of the reactor using one or more nozzles which deliver droplets of less than 200 microns.

Nishino et al (Toku-Kai-Hei 7-71907) teaches an apparatus of producing ethyl acetate by reacting ethylene and acetic acid in gas state in the presence of a heteropolyacid catalyst (see page 1, an abstract section), connecting concentric three or three to five (see page 5, lines 16-17) long tube tubes as reactors (see page 6, lines 16-17). In addition, the structure of the reactors contains a multi-tube thermal interchange device and the reactors can be arranged vertically or horizontally (see page 5, line 33). With respect to the form cooling system, multiple tubes, spiral tube, tube with fins, and etc can be used and positioned at the middle part of the insulated

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reactor (see page 6 ,line 2) ; as for the cooling medium, any of water, oil or medium with volatility can serve the purpose of cooling the passing gases down (see page 5, lines 35-38). In addition, Nishino et al gives a guidance as to the control mechanism which controls the temperature at the exit of cooling unit to ensure the concentration set to be maintained at the exit of the final reactor , thereby increasing the conversion ratio of ethyl acetate (see page 5 , lines 19-22).

With respect to the size of droplets having a less than 200 microns, the references are silent. However, the size of droplets is directly related to the optimization of the cooling system. Furthermore, the Nishino et al has indicated that any unspecific size of spiral tube can be applied for the process. Therefore, it would have been obvious to the skilful artisan in the art to be motivated to change from any size of spiral tube to the specific claimed size by routine experimentation in order to optimize the cooling system of the process.

Nishino et al does teach that the esterification process can take place in horizontally connecting three or three to five long tubular reactors ,whereas the Atkins et al process is expressly conducted in the three-zone concentric tubular reactor. Both prior art processes are involved with the production of forming ethyl acetate by reacting ethylene with acetic acid in the reactor. Nishino et al has offered guidance that the control mechanism for the reaction temperature is required for the reactors in order to increase the conversion ratio of ethyl acetate. Therefore, it would have been obvious to the skilful artisan in the art to be motivated to incorporate a teaching of Nishino's et al four tubular reactors in series ,along with the control



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mechanism, into the Atkins et al reactor in order to ensure the maximization of the conversion ratio of ethyl acetate because the skilled artisan in the art would expect such a modification to be successful as well as to be effective in the process of obtaining the desired ethyl acetate product as the guidance shown in the Nishino et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Taylor Victor Oh whose telephone number is 571-272-0689. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cecilia Tsang can be reached on 571-272-0562. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*gv*  
*10/24/04*

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